

SOLICITATION NO. W911WN-05-B-0002

FABRICATION OF EMERGENCY BULKHEADS  
EMSWORTH LOCKS AND DAM  
PENNSYLVANIA

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NUMBER 5

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<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>				1. CONTRACT ID CODE		PAGE OF PAGES	
2. AMENDMENT/MODIFICATION NO. <div style="text-align: center;">0005</div>		3. EFFECTIVE DATE <div style="text-align: center;">07/15/05</div>		4. REQUISITION/PURCHASE REQ. NO. <div style="text-align: center;">W81ET4-5119-3767</div>		5. PROJECT NO. (If applicable)	
6. ISSUED BY US ARMY ENGR DISTRICT PGH WM S MOORHEAD FEDERAL BLDG, ROOM 2116 1000 LIBERTY AVENUE PITTSBURGH PA 15222-4186 George L. Kusko BR-C (412)395-7480		CODE		7. ADMINISTERED BY (If other than Item 6) US ARMY ENGR DISTRICT PGH WM S MOORHEAD FEDERAL BLDG, ROOM 2116 1000 LIBERTY AVENUE PITTSBURGH PA 15222-4186		CODE	
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP code)				(X)		9A. AMENDMENT OF SOLICITATION NO. <div style="text-align: center;">DACW59-05-B-0002</div>	
						9B. DATED (SEE ITEM 11) <div style="text-align: center;">06/01/05</div>	
						10A. MODIFICATION OF CONTRACT/ORDER NO.	
						10B. DATED (SEE ITEM 13)	
CODE		FACILITY CODE					

**11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS**

☒ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☒ is extended, ☐ is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

**13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.**

(X)	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority)

**E. IMPORTANT:** Contractor ☐ is not, ☐ is required to sign this document and return \_\_\_\_\_ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

SEE ATTACHED

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
15B. CONTRACTOR/OFFEROR  <div style="text-align: center;">(Signature of person authorized to sign)</div>	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA  BY <div style="text-align: center;">(Signature of Contracting Officer)</div>	16C. DATE SIGNED

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The following changes are made to the Specifications for Fabrication of Emergency Bulkheads, Ohio River, Emsworth Locks and Dam, Pennsylvania:

Standard Form 33, Solicitation, Offer and Award

Block 9. A new bid opening date has been established. Change the bid opening date from “11 JUL 2005” to 26 JUL 2005. The bid opening time remains at 11:00 a.m.

Section C – Description/Specs/Work Statement

Section 01151 – Special Project Procedures

Delete page SECTION 01151 Page 4 and substitute the attached revised page 4.

Section 05502 – Metals: Miscellaneous, Standard Articles, Shop Fabricated Items

Delete the entire section and substitute the attached revised Section 05502.

Section 11295 – Bulkheads and Accessories

Delete the entire section and substitute the attached revised Section 11295.

Section F – Deliveries or Performance

Paragraph 52.211-10 – Commencement, Prosecution, and Completion of Work

In the third line, delete “two hundred ten (210)” and insert two hundred twenty four (224).

Drawings

Delete the following drawings and substitute the attached revised drawings:

<u>Delete</u>	<u>Substitute</u>
0-LEM-0/26.1	0-LEM-0/26.2
0-LEM-58/25.1	0-LEM-58/25.2
0-LEM-58/26.1	0-LEM-58/26.2
0-LEM-58/27.1	0-LEM-58/27.2
0-LEM-58/28.1	0-LEM-58/28.2
0-LEM-58/29.1	0-LEM-58/29.2
0-LEM-58/30.1	0-LEM-58/30.2
0-LEM-58/31.1	0-LEM-58/31.2
0-LEM-58/32.1	0-LEM-58/32.2
0-LEM-58/33.1	0-LEM-58/33.2
0-LEM-58/34.1	0-LEM-58/34.2
0-LEM-58/35.1	0-LEM-58/35.2
0-LEM-58/36.1	0-LEM-58/36.2
0-LEM-58/37.1	0-LEM-58/37.2
0-LEM-58/38.1	0-LEM-58/38.2

0-LEM-58/39.1  
0-LEM-58/40.1  
0-LEM-58/41.1  
0-LEM-58/42.1  
0-LEM-58/43.1

0-LEM-58/39.2  
0-LEM-58/40.2  
0-LEM-58/41.2  
0-LEM-58/42.2  
0-LEM-58/43.2

**IN ORDER FOR BIDS TO BE CONSIDERED RESPONSIVE, ALL  
AMENDMENTS MUST BE ACKNOWLEDGED.**

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PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 POSITIONING FOR ACCEPTANCE TRIAL OPERATION

3.1.1 General

The Contractor shall be responsible for delivering all of the bulkhead units on barge(s) to a designated gate bay upstream of the Emsworth Main Channel Dam. The Contractor shall position each bulkhead unit in the gate bay for pickup by the Government monorail bulkhead hoist and test operation in the bulkhead slot. Test operation will be performed by the Government in accordance with Section 11295 BULKHEADS AND APPURTENANCES, paragraph "Acceptance Trial Operation".

3.1.2 Government Services

The Government will provide the following services in connection with acceptance trial operation:

Remove and replace aluminum handrail at the bulkhead dogging level of the dam piers for the gate bay in which the bulkhead unit is to be operated.

Position the monorail bulkhead hoist.

Attach the lifting beam to the bulkhead unit.

Raise the bulkhead unit from its position under the monorail bulkhead hoist.

Position and lower the bulkhead unit in the bulkhead slot.

Raise and lower the bulkhead unit as necessary to demonstrate proper operation and sealing.

Return the bulkhead unit to the original pickup location as necessary for indicated repairs or adjustments. Any additional movement, beyond the original pickup position, required for performing repairs or adjustments shall be the responsibility of the Contractor.

Move bulkhead unit that are to remain at the project to a dogged position in another gate bay or place it back in the original pickup position for repositioning and delivery to PEWARS as applicable.

Move bulkhead unit that are to be delivered to PEWARS to the original pickup position for repositioning and delivery to PEWARS as applicable.

Unload the two bulkhead units upon arrival at PEWARS.

Only Government personnel will operate the monorail bulkhead hoist.

3.1.3 Contractor Responsibility

The Contract shall provide the following services in connection with delivery and trial operation:

Deliver all of the bulkhead units to the upstream face of the dam at

the designated gate bay on barge(s).

Raise and position each bulkhead unit to a position within the gate bay that will permit attaching of the lifting beam by the Government.

Make repairs and adjustments as required to place the bulkhead unit in compliance with the specification requirements, including removal from or repositioning in the gate bay.

Receive the two bulkhead units to be delivered to PEWARS on the Contractor's barges.

Secure the two bulkhead units and deliver to PEWARS as specified in Section F DELIVERIES AND PERFORMANCE, clause 52.211-4001 Place Of Delivery.

### 3.2 BULKHEAD UNIT POSITIONING AT GATE BAY UPSTREAM OF THE MAIN CHANNEL DAM

#### 3.2.1 General

The Contractor is advised that the placement of a bulkhead unit is a difficult task that will be supported by the Government. The support by the Government will be limited by the existing equipment and machinery at the Main Channel Dam. This equipment and machinery has load limitation, reach limitation, pick-up point limitation, and other limitations due to the characteristics of the site.

The Contractor shall be solely responsible for meeting all of the constraints and limitations of the Government equipment, machinery, and structure.

#### 3.2.2 Pre-Delivery Coordination

The Contractor shall meet with the Government representative to be briefed on the limitations of the Government support. The Contractor shall submit a delivery and positioning plan addressing the limitations established by the Government and the field visit and briefing. The delivery and positioning plan will be reviewed by the Government and the Government reserves the right to revise and/or alter the Contractor's delivery and positioning plan.

#### 3.2.3 Facility and Equipment Limitations

The Government equipment and facility limitations associated with the trial operation of the bulkhead units include, but may not be limited to, the following:

1. ~~The monorail bulkhead hoist working load limit is 20 tons.~~ The maximum weight of a single bulkhead unit shall not exceed 21 tons (42,000 lbf).
2. Geometric constraints due to pier configuration and bulkhead recess location prevent the direct installation of the bulkhead units. The bulkhead units will need to be elevated, moved, and rotated into position within the confines of the existing piers, landings, and recesses without any demolition work.

This is NOT a complete list of limitations, and the Government does not warrant and/or guarantee that a Contractor's plan that addresses these limitations would be sufficient to accomplish the installation of the bulkhead units.



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DIVISION 05 - METALS

SECTION 05502

METALS: MISCELLANEOUS, STANDARD ARTICLES, SHOP FABRICATED ITEMS

09/03

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SECTION 05502

METALS: MISCELLANEOUS, STANDARD ARTICLES, SHOP FABRICATED ITEMS  
09/03

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM A 240/A 240M	(2003c) Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels for General Applications
ASTM A 276	(2003) Stainless Steel Bars and Shapes
ASTM A 484/A 484M	(2003a) General Requirements for Stainless Steel Bars, Billets, and Forgings
ASTM A 564/A 564M	(2002a) Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes
ASTM B 148	(1997; R 2003) Aluminum-Bronze Sand Castings
ASTM B 209	(2002a) Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B 211	(2002) Aluminum and Aluminum-Alloy Bar, Rod, and Wire
ASTM B 308/B 308M	(2002) Aluminum-Alloy 6061-T6 Standard Structural Profiles
ASTM F 593	(2002) Stainless Steel Bolts, Hex Cap Screws, and Studs
ASTM F 594	(2002) Stainless Steel Nuts

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fabrication of Emergency Bulkheads  
Emsworth Dam, Ohio River

Shop Fabricated Metal Items; G, DO

Detail drawings shall be submitted for approval as specified and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

SD-03 Product Data

Miscellaneous Metals and Standard Metal Articles; G, DO  
Shop Fabricated Metal Items; G, DO

Lists of materials, and records which identify the disposition of approved material and fabricated items in the work, shall be submitted for approval as specified and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

SD-06 Test Reports

Miscellaneous Metals and Standard Metal Articles; G, DO  
Shop Fabricated Metal Items; G, DO

Certified test reports for materials tests and analyses shall be submitted for approval as specified and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

1.3 FABRICATION AND WORKMANSHIP REQUIREMENTS

Fabrication requirements and workmanship provisions for items specified in this section shall conform with the requirements of Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

PART 2 PRODUCTS

2.1 MISCELLANEOUS METALS AND STANDARD METAL ARTICLES

Miscellaneous metal materials and standard metal articles shall conform to the respective specifications and other designated requirements. Sizes shall be as specified or shown. Where material requirements are not specified, materials furnished shall be suitable for the intended use and shall be subject to approval.

2.1.1 Stainless Steel

2.1.1.1 Plate, Sheet, and Strip

ASTM A 240/A 240M, UNS S30400. Plate finish shall be hot-rolled and annealed or heat treated, and blast cleaned or pickled. Sheet and strip finish shall be No. 1.

2.1.1.2 Bars and Shapes

Stainless steel bars and shapes shall conform to the following as specified or shown:

- a. ASTM A 276, UNS S30400 with a maximum carbon content of 0.08 percent, Condition A, hot-finished or cold-finished, Class C.

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2.1.1.3 Roller Shapes for Roller Systems

- a. Bulkhead Rollers - ASTM A 564/A 564M, UNS S17400 or S45000, age-hardened heat treated to obtain a Brinell hardness range of 331 minimum to 401 maximum, hot-finished or cold-finished, Class C. Heat treatment of rollers and plates shall not commence until the heat treatment procedure and the test reports for other required material tests are approved. After heat treating and final machining, each roller and track plate shall be free of scale and cracks, as determined by magnetic particle, florescent, or dye penetrant inspection tests.

(1) Hardness Check Tests - Suitable 1/2 inch thick samples of the material from each heat shall be tested to determine the hardness in both the solution-annealed and age-hardened conditions. Where the oven-batch heat-treating process is used, hardness check tests shall be performed on material of each heat in each oven batch. Where a continuous heat-treating process is used, three check tests shall be performed on material of each heat: one on the first material through the process, one at the middle of the run, and one on the last material through the process.

- b. Bulkhead Roller Pins & Axles

(1) Pins - ASTM A 276, UNS S21800, Condition A, cold-finished or hot-rolled and machine-finished to the tolerances specified in ASTM A 484/A 484M for cold-finished round bars, Class C. Machined pins should have a surface roughness of not exceeding 63 microinches.

2.1.2 Aluminum

2.1.2.1 Sheets and Plates

ASTM B 209, Alloy 6061, Temper T6.

2.1.2.2 Bars, Rods and Wire

ASTM B 211, Alloy 6061, Temper T6.

2.1.2.3 Structural Shapes

ASTM B 308/B 308M, Alloy 6061, Temper T6.

2.1.3 Bronze

2.1.3.1 Aluminum Bronze Castings

- a. 6-inch Roller Bushings: ASTM B 148, Copper Alloy UNS No. C95500 as required by manufacturer and approved by Contracting Officer.

2.1.4 Bolts, Nuts, and Washers

Bolts, nuts, and washers shall be of the material, grade, type, class, style and finish indicated or best suited for intended use.

2.1.4.1 Bolts, Nuts, and Washers (Fastening Aluminum to Aluminum)

- a. Bolts - ASTM F ~~593~~468, ~~F593G or F593H, Group 2 316, Condition CW~~

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Alloy 7075-T73.

- b. Nuts - ASTM F ~~594467~~, ~~F594G~~ or ~~F594H~~, ~~Group 2 316~~, ~~Condition CW~~  
Alloy 6262-T9 or 6061-T6.
- c. Washers
  - (1) Plain Washers - ~~ASTM A 240/A 240M~~Alloy, Alclad 2024-T4, 316.
  - (2) Beveled Washers - As required by AA ADM 1.

2.1.4.2 Bolts, Nuts, and Washers (Fastening Stainless Steel to Aluminum or Stainless Steel)

- a. Bolts - ASTM F 593, F593G or F593H, alloy group 2, 316, Condition CW, where indicated to be stainless steel.
- b. Nuts - ASTM F 594, F594G or F594H, alloy group 2, 316, Condition CW, where stainless steel bolts are indicated.
- c. Washers - ASTM A 240/A 240M Type 316, where stainless steel bolts are indicated.
- d. Where bolts are indicated to be aluminum, bolts, nuts, and washers shall conform to requirements indicated in this Section, paragraph 2.1.4.1.

2.1.5 Screws

Screws shall be of the material, grade, type, style, and finish indicated or best suited for use intended.

2.2 SHOP FABRICATED METAL ITEMS

Shop fabricated metal items shall conform to the requirements and details as specified or shown and to the workmanship provisions and other applicable fabrication requirements as specified in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.2.1 Wheels

Wheels shall be rigid type, heavy duty stainless steel casters. Wheels shall be of the size shown. Wheels shall be provided with lubrication fittings, roller bearings, and removable axle or shaft. Wheel treads shall be machined-finished as shown. Unless otherwise specified or shown, shafts for wheels shall be stainless steel.

PART 3 EXECUTION (Not Applicable)

-- End of Section --

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SECTION 11295

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SECTION 11295

BULKHEADS AND ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

This Section of the Specifications outlines the requirements for new bulkheads and accessories. Coordination of design of seals and mechanical rollers and installation of the work of various trades shall be the responsibility of the Contractor.

1.2 RELATED WORK SPECIFIED ELSEWHERE

SECTION 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS

SECTION 05502 METALS: MISCELLANEOUS, STANDARD ARTICLES, SHOP FABRICATED ITEMS

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM A 276	(2003) Stainless Steel Bars and Shapes
ASTM D 2240	(2000) Rubber Property-Durometer Hardness
ASTM D 395	(1998) Rubber Property - Compression Set
ASTM D 412	(1998a) Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension
ASTM D 471	(1998el) Rubber Property - Effect of Liquids

1.4 GENERAL DESCRIPTION

The bulkheads shall be of bolted structural aluminum fabrication with skin plate and rubber seals. The seal seats shall be of stainless steel or aluminum as indicated and are part of the bulkhead frames. Each bulkhead shall be provided with a total of twelve (12) rollers. Six (6) rollers at each end, to guide the bulkhead in each bulkhead slot and prevent it's jamming in the slot.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When



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used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Welding; G DO.

Schedules of welding procedures for structural aluminum shall be submitted as specified in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

SD-02 Shop Drawings

Fabrication and Assembly Drawings; G DO.

Detail drawings, except delivery drawings, shall be provided by the Government. Deviations from the provided detail drawings shall be submitted as specified herein and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS for the bulkheads.

Deviations of detail drawings shall include fabrication drawings and assembly drawings.

- a. Fabrication Drawings. These drawings shall show complete details of each piece of the structural unit that identifies the material(s), tolerances, connections, machined surface finishes, and proposed welding sequences which clearly differentiate shop welds and field welds. Each piece shall be mark numbered and matched to an assembly drawing showing the overall assembly of the structural unit including details of the connections. Fabrication drawings shall include drawings that present bills of materials (i.e. material schedules) that tabulates each piece, quantity and weights. Fabrication drawings shall also include general notes related to fabrication.
- b. Assembly Drawings. These drawings will present plan, elevation, and detail views of the bulkhead units and pickup frame so that it is clearly understood how each (mark numbered) piece (as shown on the fabrication drawings) is incorporated into the unit.

Deviations of detail drawings shall be submitted to the Contracting Officer for review a minimum of 15 days prior to ordering materials. No materials shall be ordered until detail drawings are approved by the Contracting Officer.

Delivery Drawings; G DO

- a. Delivery Drawings. These drawings shall provide descriptions of methods of delivering components to the site, including details for supporting fabricated components during shipping to prevent distortion or other damages.

Delivery Drawings shall be supplied by the Contractor and shall be submitted as specified herein. Delivery drawings shall be submitted to the Contracting Officer for review a minimum of 15 days prior to ordering materials. No materials shall be ordered until delivery drawings are approved by the Contracting Officer.

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SD-03 Product Data

Materials; G RO

Materials orders, materials lists and materials shipping bills shall be submitted as specified in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

SD-06 Test Reports

Tests, Inspections, and Verifications; G DO

Certified test reports for material tests shall be submitted with all materials delivered to the site.

SD-07 Certificates

Weight Certificate; G

Certified weight report for each of the ~~four(4)~~ entirely assembled bulkheads prior to transporting to project site.

1.6 QUALIFICATION OF WELDERS AND WELDING OPERATORS

Qualification of welders and welding operators shall conform to the requirements of Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

1.7 DELIVERY, STORAGE, AND HANDLING

Delivery and handling of materials and fabricated items shall conform to the requirements specified herein and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

1.7.1 Rubber Seals

Rubber seals shall be stored in a place which permits free circulation of air, maintains a temperature of 70 degrees F or less, and prevents the rubber from being exposed to the direct rays of the sun. Rubber seals shall be kept free of oils, grease, and other materials which would deteriorate the rubber. Rubber seals shall not be distorted during handling.

PART 2 PRODUCTS

2.1 MATERIALS

Materials orders, materials lists, and materials shipping bills shall conform with the requirements of Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.1.1 General Purpose Corrosion Resistant Steel

ASTM A 276, UNS S30400 with a maximum carbon content of 0.08 percent, Condition A, hot-finished or cold-finished, Class C..

2.1.2 Rollers

See Section 05502 METALS: MISCELLANEOUS, STANDARD ARTICLES, SHOP FABRICATED

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ITEMS.

2.1.3 Corrosion Resistant Aluminum and Stainless Steel Bolts and Nuts

See Section 05502 METALS: MISCELLANEOUS, STANDARD ARTICLES, SHOP FABRICATED ITEMS, paragraphs "Bolts, Nuts, and Washers (Fastening Aluminum to Aluminum)", "Bolts, Nuts, and Washers (Fastening Stainless Steel to Aluminum or Stainless Steel)", and "Screws".

2.1.4 Roller Axles and Roller Pins

See Section 05502 METALS: MISCELLANEOUS, STANDARD ARTICLES, SHOP FABRICATED ITEMS.

2.1.5 Miscellaneous Pins

See Section 05502 METALS: MISCELLANEOUS, STANDARD ARTICLES, SHOP FABRICATED ITEMS.

2.1.6 Aluminum Bronze Bushings

See Section 05502 METALS: MISCELLANEOUS, STANDARD ARTICLES, SHOP FABRICATED ITEMS.

2.1.7 Rubber Seals

Rubber seals (J-seals and Omega seals) shall be flouoro-carbon (Teflon) clad rubber seals of the mold type only, shall be compounded of neoprene, or copolymer of butadiene and styrene, or a blend of both. Physical characteristics of the seals shall meet the following requirements:

PHYSICAL TEST	TEST VALUE	TEST METHOD SPECIFICATION
Tensile Strength	2000 psi (min.)	ASTM D 412
Elongation at Break	450% (min.)	ASTM D 412
300% Modulus	900 psi (min.)	ASTM D 412
Durometer Hardness (Shore Type A)	50 to 60	ASTM D 2240
*Water Absorption	5% by weight (max.)	ASTM D 471
Compression Set	30% (max.)	ASTM D 395

\* The "Water Absorption" test shall be performed with distilled water. The washed specimen shall be blotted dry with filter paper or other absorbent material and suspended by means of small glass rods in the oven at a temperature of 70 degrees +/- 2 degrees C for 22 +/- 1/4 hour. The specimen shall be removed, allowed to cool to room temperature in air, and weighed. The weight shall be recorded to the nearest 1 mg as W1 (W1 is defined in ASTM D 471). The immersion temperature shall be 70 degrees +/- 1 degree C and the duration of immersion shall be 166 hours.

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2.1.7.1 Fabrication

Rubber seals shall have a flouro-carbon film vulcanized and bonded to the sealing surface of the bulb. The film shall be 0.060 inch thick Huntington Abrasion Resistant Flouro-Carbon Film No. 4508, or equal, and shall have the following physical properties:

Tensile strength .....2,000 psi (min.)

Elongation.....250 percent (min.)

The outside surface of the bonded film shall be flush with the surface of the rubber seal and shall be free of adhering or bonded rubber. Strips and corner seals shall be molded in lengths suitable for obtaining the finish lengths shown on the drawings and with sufficient excess length to provide test specimens for testing the adequacy of the adhesion bond between the film and bulb of the seal. At one end of each strip or corner seal to be tested, the flouro-carbon film shall be masked during bonding to prevent a bond for a length sufficient to hold the film securely during testing.

2.2 MISCELLANEOUS ITEMS

Miscellaneous items and Materials not otherwise specified herein shall conform to the applicable requirements of Section 05502 METALS: MISCELLANEOUS, STANDARD ARTICLES, SHOP FABRICATED ITEMS.

PART 3 EXECUTION

3.1 FABRICATION

3.1.1 Detail Drawings

Deviations of detail drawings, including Fabrication and Assembly Drawings, shop assembly drawings, delivery drawings, and field installation drawings, shall conform to the requirements specified herein and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

3.1.1.1 Fabrication and Assembly Drawings

Deviations of fabrication drawings shall show complete details of materials, tolerances, connections, machined surface finishes, and proposed welding sequences which clearly differentiate shop welds and field welds. Deviations of shop assembly drawings shall provide details for connecting the adjoining fabricated components in the shop to assure satisfactory field installation.

3.1.1.2 Delivery Drawings

Delivery drawings shall provide descriptions of methods of delivering components to the site, including details for supporting fabricated components during shipping to prevent distortion or other damages.

3.1.2 Structural Fabrication

Structural fabrication shall conform with the requirements shown on the drawings and specified herein and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS. Components shall be shop-fabricated of the materials specified and shown on the drawings. Dimensional tolerances shall be as specified and shown on the drawings.

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Splices, if required, shall occur only where shown on the drawings, shop drawings, or approved by the Contracting Officer. ~~The shop drawings provided to the Contractor will indicate revised splice locations such that member lengths will not exceed 25 feet.~~ The entire bulkhead shall be shop assembled and, if required, disassembled at splice locations for field reassembly. Bolt holes shall be bored in components after clamping and straightening are completed. Brackets and other components requiring straightening shall be straightened by methods which will not damage the material. Bronze bushings shall be press-fitted with supporting components. Bolt connections, lugs, clips, or other pick-up assembly devices shall be provided for components as shown and required for proper assembly and installation. Provisions shall be made for the installation of appurtenances as required.

3.1.3 Welding

Welding shall conform with the requirements specified herein, and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS. Welds shall only be where and of the type shown on the contract drawings and approved detail drawings. Nondestructive examination is required on the major shop welds of the types as follows:

- a. One hundred percent (100%) visual

3.1.4 Bolted Connections

Bolted connections shall conform with the requirements specified in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

3.1.5 Machine Work

Machine work shall conform with the requirements specified in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

3.1.6 Miscellaneous Provisions

Miscellaneous provisions for fabrication shall conform with the requirements specified herein and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

3.1.7 Fabrications

3.1.7.1 Bulkheads

Bulkheads shall be of bolted fabrication as shown on the drawings. Structural fabrication shall conform to the requirements as shown and specified herein and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS. Dimensional tolerances shall be as specified and as shown. Splices shall occur only where shown or approved by the Contracting Officer. Bulkhead units shall be shop-fabrication in one piece. The Contractor shall obtain and submit a certified Weight Certificate for each of the completely fabricated bulkheads prior to any transportation or shipping for delivery to the project site. Fabrication in separate segments without shop assembly will not be permitted. The Contractor shall prepare and execute a bolting sequence for the shop bolting of the bulkheads, which, in conjunction with the joint bolting procedures and overall fabrication methods, will control distortion to produce a completed assembly meeting the quality requirements and tolerances specified. Bulkheads shall be provided with seal assemblies and

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other appurtenant items as shown on the drawings. The Contractor shall lift each of the completely fabricated bulkheads from the lifting assembly in the shop to establish the center of gravity of the bulkhead. When lifted the bulkhead shall not vary from plumb by more than 1/8" over the height of the bulkhead. The Contractor shall fasten additional aluminum material (ballast) as necessary to achieve the desired center of gravity within tolerances specified. Weight Certificate shall be obtained after the addition of any required ballast. Weight of each bulkhead shall not exceed 42,000 pounds force (21 tons).

3.1.7.2 Bulkhead Skin Plates

The outside surfaces of skin plates bolted to framing elements shall not vary from a true plane by more than 1/16 inch. Splices in skin plates shall be located only where shown. The overall width and height of the fabricated bulkhead shall not vary from the respective dimensions shown by more than 1/28 inch.

3.1.7.3 Bulkhead Frame and Guides

Exposed unmachined surfaces of bulkhead frames shall match at joints between component parts, shall not depart from true planes shown by more than 1/16 inch, and shall be free of offsets or irregularities greater than 1/16 inch.. Allowable offsets or irregularities less than 1/16 inch shall be ground to a bevel of not greater than one on twenty four. ~~Installation shall maintain surface straightness to within 1/8 inch overall in both plan dimensions.~~ Fabrication shall maintain straightness over the longitudinal length (parallel to upstream and downstream chords) to a maximum deviation of 3/8 inch from the theoretical work point centerline. Fabrication shall be maintained such that the maximum deviation of the bulkhead over its entire length from the upstream chord work point centerline to the downstream chord work point centerline shall be less than 1/8 inch.

3.1.8 Shop Assembly

Shop assembly requirements for bulkheads shall be as shown on the drawings and specified herein and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS. Rubber seals shall be fitted and drilled to match the seal clamping bars, match-marked and then removed for shipment. Shop assembly shall include the attachment of all accessories to the each bulkhead. If the bulkhead is out of plumb when lifted by more than 1/84 inch in the total length in a vertical plane in the upstream-downstream direction, or by more than 1/84 inch in the total width in a vertical plane perpendicular to the vertical plane in the upstream-downstream direction, it shall be balanced by counterweighting or some other method as approved at the Contractor's expense. Shop assembly and disassembly work shall be performed in the presence of the Contracting Officer unless otherwise waived in writing by the Contracting Officer. The presence of the Contracting Officer during assembly or disassembly will not relieve the Contractor of any responsibility under this contract.

3.1.8.1 Wheel Assemblies

The bulkhead wheel assemblies shall be products of a manufacturer regularly engaged in the manufacture of such products. Each wheel assembly shall be provided complete with wheel, shaft, roller bearing, lock washer, lock nut, bearing cover, seal housing, grease seal, seal retainer, shaft lock plate, lubrication fittings, fasteners, and other accessories as required for complete and proper installation. Wheel diameter and thickness shall not

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be changed from that shown. The dimensions and tolerances of other components may be changed as required for compatibility with the manufacturer's product.

3.1.8.2 Seal Assemblies

The bulkhead seal assemblies shall consist of rubber seals, stainless steel retainer and spacer bars, and fasteners where indicated. Rubber seals shall be continuous over the full length. Seals shall be accurately fitted and drilled for proper installation. Bolt holes shall be drilled in the rubber seals by using prepared templates or the retainer bars as templates.

Splices in seals shall be fully molded, develop a minimum tensile strength of 50 percent of the unspliced seal, and occur only at locations shown. All vulcanizing of splices shall be done in the shop. The vulcanized splices between molded corners and straight lengths shall be located as close to the corners as practicable. Splices shall be on a 45 degree bevel related to the "thickness" of the seal. The surfaces of finished splices shall be smooth and free of irregularities. Stainless steel retainer bars shall be field-spliced only where shown and machine finished after splicing.

3.2 TESTS, INSPECTIONS, AND VERIFICATIONS

Tests, inspections, and verifications for materials shall conform to the requirements specified herein and in Section 05055 METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS. Shop assembled components shall be inspected for accurate fit and compliance with dimensional tolerances. Sealing, guiding, and connecting surfaces shall be inspected to determine if their planes are true, parallel, and in uniform contact with opposing surfaces.

3.2.1 Acceptance Trial Operation

The Contracting Officer will examine the bulkheads for final acceptance. The bulkheads will be examined first to determine whether or not the workmanship conforms to the specification requirements. Final acceptance of the bulkheads will not be made until the Government has operated the bulkheads in service. The Government will operate the bulkheads from the fully-raised to the fully-lowered position a sufficient number of times in different bays as selected by the Contracting Officer to demonstrate to the Contracting Officer's satisfaction that there is no binding, and that sealing surfaces do not leak. The workmanship shall be such that the bulkheads in the lowered position will form a watertight barrier across the opening. Required repairs or replacements to correct defects, as determined by the Contracting Officer, shall be made at no cost to the Government. The trial operation shall be repeated after defects are corrected.

3.3 PROTECTION OF FINISHED WORK

Protection of finished work shall conform to the requirements of Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

-- End of Section --

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